Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

AMERICAN
JOURNAL OF BOTANY

VOL. IV MAY, 1917 NO. 5

THE PERENNIAL SCAPOSE DRABAS OF NORTH AMERICA

EDWIN BLAKE PAYSON

The treatment of the group of Drabas here presented grew out of an attempt to name some seven members of this group collected in the summer of 1916 in the mountains of central Idaho by J. F. Macbride and the author. It soon became evident that available literature was entirely inadequate and that either specific lines were extremely hard to define or that a number of species were being treated under comparatively few names. Careful study of adequate herbarium material failed to show intermediate forms and it was noticed that each form (of which several specimens could usually be found) was restricted to a rather limited range. Differences that at first sight seemed inconsequential proved to be constant. The conclusion was obvious that there were within this group many distinct and easily separable species. That they should have long passed for a few was not strange when their diminutive size was considered. Practically all are plants of arctic or alpine habitats and this alone might account for their very similar aspect. Under similar conditions the various species have developed along analogous lines. The author believes that with the recognition of many instead of few species practically all difficulty in the determination of these plants will disappear.

In the twenty-six species comprising this group three are circumpolar and are also found in the main chain of the Rocky Mountains. One is a local species from the region of Hudson Bay. Twenty-two are peculiar to western North America and their distribution will be considered in detail. Seven have been found in the Rocky Mountains proper and, of these seven, two have possibly been developed farther westward and have migrated east. Fifteen are truly western, since no representatives have been reported from the Rocky Mountains. Of these fifteen, four are peculiar to Idaho and seven are found farther west in Nevada, California and Oregon. Sixteen of the twenty-two are not found as far north as the southern boundary of Washington and perhaps none extend farther south than the southern boundary of Colorado and Utah. It can thus be seen that the great multiplication of species occurs between the thirty-seventh and forty-sixth parallels of north latitude and west of the main chain of the Rocky Mountains. This region is characterized by many more or less isolated mountain ranges, ranges often separated by many miles of low territory. Since climatic and edaphic conditions are in general very similar in most alpine regions and the specific distinctions are not of such a nature as to be considered adaptive, we can scarcely believe that the differentiation of species has come about by selection. There is, however, a close relation between isolation and the multiplication of species and this factor must be considered seriously in any attempt to account for the evolution of this group.

Characters that do not vary with ecological conditions and remain constant in a given species are often quite different in different families and even genera. Of paramount importance to the systematist in these Drabas is the character of the pubescence. Classification must always be based primarily upon this character. The uniformity of the pubescence within a species is most interesting and the use of a lens or even a compound microscope is imperative. Some species never bear truly stellate hairs, as for example, *D. alpina* and *D. fladnizensis*. One very interesting species bears no other hairs on the leaves except strong marginal cilia. In some species no cilia are present and the leaf surface is covered with sessile stellate hairs as in *Lesquerella*. *D. cruciata* and *D. asterophora* are of especial interest because of the prevalence of cruciform hairs. Nearly every species might be determined by the character of the pubescence alone. Other characters of considerable importance are the presence or absence of pubescence on the pods, the length of the style, the shape of the pod, the shape of the leaf and the form of the fruiting inflorescence.

The material cited under the specific names may be found in the Rocky Mountain Herbarium at the University of Wyoming and in the herbarium of the Missouri Botanical Garden at St. Louis. To the curators of these institutions the author wishes to express his gratitude.

Much of the material seen has been examined by Dr. E. Gilg. He used a number of herbarium names which have unfortunately never been published and there is some confusion as to his conception of types. His determinations were very valuable and often served to corroborate the author's opinions. The types of the species published by Macbride and Payson are to be found in the Gray Herbarium at Harvard; those published by the author alone are in the Rocky Mountain Herbarium, with the exception of *D. Mulfordae*, which is at St. Louis. Some names are omitted from this treatment that might be expected here. *D. crassifolia* Graham is scapose but belongs rather to the biennial class than to these densely cespitose plants. The identity of *D. densifolia* Nutt. remains obscure. Material labeled as typical in the Gray Herbarium seems referable to *D. oligosperma*. *Draba eurycarpa* Gray has long been considered related to this group of plants, but there seems to be some doubt about it being a Draba.

Key to the American Perennial Scapose Drabas

- Leaves bearing no stellate or conspicuously branching hairs.
  - Leaves densely imbricated, forming compact, subspherical tufts on the ends of the caudex branches, pods corymbose.
    - Pods glabrous..4. *D. globosa.*
    - Pods pubescent, more densely cespitose................5. *D. sphaerula.*
  - Leaves not so densely imbricated, scapes mostly over 1 cm. long.
    - Style very short, stigma sessile or subsessile.
      - Pods racemose, flowers yellow.......................1. *D. alpina.*
      - Pods corymbose, flowers white.......................2. *D. fladnizensis.*
    - Style evident, .5 mm. or more long.
      - Pods glabrous.
        - Leaves 5–6 mm. long, obovate.....................15. *D. cylomorpha.*
        - Leaves 2–3 mm. long, pods narrowly elliptical.....3. *D. oreibata.*
      - Pods pubescent.
        - Leaves broadly oblanceolate......................16. *D. Lemmoni.*
        - Leaves linear, midvein prominent.
          - Leaves glabrous except for strong cilia on the margins................................7. *D. Nelsonii.*
          - Leaves pubescent, cilia weak...................6. *D. Douglasii.*
- Leaves bearing some stellate or branching hairs.
  - Pods glabrous.
    - Style less than .5 mm. long.
      - Pods linear (1 cm. or more long)...................13. *D. lonchocarpa.*
      - Pods broader, less than 1 cm. long.
        - Leaves stellate..................................12. *D. nivalis.*

      - Leaves with simple or branching hairs........... 1. *D. alpina.*
  - Style evident (over .5 mm. long).
    - Pods globose.................................. 22. *D. sphaeroides.*
    - Pods flattened.
      - Pods 3–4 mm. long.
        - Leaves obovate.......................... 21. *D. uncinalis.*
        - Leaves linear............................. 9. *D. oligosperma.*
      - Pods over 5 mm. long.
        - Leaves broadly linear..................... 14. *D. laevicapsula.*
        - Leaves broadly spatulate or oblanceolate.
          - Leaves densely stellate and silvery....... 24. *D. argyrea.*
          - Leaves more sparsely pubescent, green.
            - Pods narrowly lanceolate, not over 2 mm. wide...................... 20. *D. cruciata.*
            - Pods broader (3 mm. or more).
              - Hairs mostly cruciform........... 17. *D. asterophora.*
              - Hairs simple or branching.......... 1. *D. alpina.*
- Pods pubescent.
  - Seeds winged, leaves silvery......................... 23. *D. pterosperma.*
  - Seeds not winged.
    - Pods globose, stellate pubescent.................. 25. *D. sphaerocarpa.*
    - Pods more or less flattened.
      - Leaves densely imbricated, not over 5 mm. long, silvery stellate, cilia absent................. 26. *D. subsessilis.*
      - Leaves not so densely imbricated, mostly over 5 mm. long.
        - Leaves linear or slightly spatulate.
          - Fruiting raceme corymbose............. 11. *D. vestita.*
          - Fruiting raceme elongated.
            - Stellate hairs sessile, near apex of leaf... 8. *D. oligosperma.*
            - Stellate hairs not sessile nor usually restricted to apex of leaf.
              - Ciliations not conspicuous, plants not soboliferous................. 9. *D. incerta.*
              - Ciliations conspicuous, plants soboliferous.................... 18. *D. Mulfordae.*
        - Leaves not linear.
          - Leaves silvery-white, entirely stellate..... 24. *D. argyrea.*
          - Leaves greenish, or if silvery, cilia evident.
            - Pods narrowly lanceolate............ 20. *D. cruciata.*
            - Pods broader (3 mm. or more).
              - Style .5 mm. long, plants of Hudson Bay.................. 10. *D. Bellii.*
              - Style 1 mm. long or more (usually).
                - Ciliations numerous and conspicuous.................. 18. *D. Mulfordae.*

Ciliations absent or inconspicuous..................19. *D. ventosa.*

1. D. ALPINA L. Sp. Pl. 642. 1753.

A circumpolar species probably never found within the United States.

Specimens Examined.—ALASKA: Hall Island, July 14, 1899, *Trelease & Saunders*, no. 3922; same locality, July 14, 1899, *Trelease & Saunders*, no. 3924.

2. D. FLADNIZENSIS Wulf. in Jacq. Misc. Austr. 1: 147. 1778.

Specimens Examined.—CANADA: Digges Island, Hudson Strait, Sept. 15, 1884, *R. Bell;* Okkak, N. E. Labrador, *G. Auspach;* Table Top Mt., Gaspe Co., Quebec, Aug. 10, 1881, *J. A. Allen;* Nottingham Island, Hudson Bay, Aug. 26, 1884, *R. Bell.* COLORADO: Gray's Peak and vicinity, Aug. 6, 1885, *H. N. Patterson*, no. 3; Sawatch Range, *Brandegee*, no. 13, 713. GREENLAND: Prakes Fiord, *W. H. Burk*, no. 10, 1891; Disco, Ivannersoil, June 22, 1871, *Th. M. Fries.* UTAH: Mt. Barette, July 26, 1905, *Rydberg & Carlton*, no. 7240.

3. **Draba oreibata** Macbride & Payson, n. sp.

Cespitose perennial: leaves oblong-linear, obtuse, 4–6 mm. long, midvein evident, glabrous except for unbranched cilia on margins: scapes leafless, slender, glabrous, 3–5 cm. long: sepals glabrous, yellowish; petals white, twice as long as the sepals: fruiting inflorescence elongated: pods flat, glabrous, narrowly elliptical, 8–10 mm. long, 2–3 mm. broad; style slender, nearly 1 mm. long.

D. oreibata probably finds its closest relative in *D. fladnizensis.* From this it may be separated by the shorter, more obtuse leaves, the elongated instead of the corymbose fruiting inflorescence, the elliptical instead of lanceolate pod and especially by the slender style. In *D. fladnizensis* the stigma is sessile or nearly so.

Specimens Examined.—IDAHO: alpine summit of Lost River Mts., west of Clyde, Blaine Co., July 10, 1916, *Macbride & Payson*, no. 3135 (type in Gray Herbarium, duplicate in Ry. Mt. Herbarium). UTAH: southern Utah, May 14, 1874, *A. L. Siler;* southern Utah (near Osmer), *A. H. Siler*, no. 34, southern Utah, 1874, *Parry*, no. 34.

4. **Draba globosa** Payson, n. sp.

Densely cespitose perennial; caudex much branched: leaves densely imbricated, forming globose tufts on the ends of the caudex-branches, scarcely over 5 mm. long, broadly linear, acute, midvein evident, glabrous except for short, unbranched marginal cilia: scapes glabrous, rather stout, scarcely 1 cm. long: flowers unknown: fruiting inflorescence corymbose: pods 4–6, broadly lanceolate, flattened, glabrous, about 5 mm. long, 3 mm. wide; style stout, scarcely 1 mm. long: seeds 2–4 in each cell, not winged.

This plant was evidently recognized as distinct by Dr. E. Gilg for I find some specimens in the Rocky Mt. Herbarium labeled by him with a name which has never been published. The aspect of this species and the next suggest *D. subsessilis* Watson. This resemblance is however probably not indicative of any real relationship.

Specimens Examined.—UTAH: Fish Lake, Uintah Mts., June 17, 1902, *Goodding;* Little Cottonwood Canyon, Salt Lake Co., Aug. 3, 1904, *Garrett*, no. 1555; Alta, Wasatch Mts., Aug. 12, 1879, *Jones*, no. 1235. WYOMING: La Plata Mines, Snowy Range, Aug. 29, 1898, *E. Nelson*, no. 5246*a* (type in Ry. Mt. Herbarium). The type was found on the same sheet with two specimens of "*D. andina*" and was given an "a" number. Other sheets of this collection in various herbaria may be found also to bear specimens of *D. globosa*.

5. **Draba sphaerula** Macbride & Payson, n. sp.

Densely pulvinate-cespitose perennial; caudex much branched: leaves about 2 mm. long, densely clustered on the ends of the caudex branches into small, compactly imbricated spheres, glabrous except for the unbranched marginal ciliae, broadly linear, acute, midvein obscure: scapes barely rising above the leaves, pubescent: sepals pubescent, yellowish; petals yellow, exceeding the sepals but little: fruiting inflorescence corymbose: pods few (1 or 2), broadly lanceolate, about 3 mm. long, flattened, pubescent with stellate or branched pubescence; style evident, less than 1 mm. long: seeds neither winged nor margined.

D. sphaerula is quite closely related to *D. globosa* and further collections may even show the two to merge. It differs from *globosa* in the pubescent instead of the glabrous pods, the smaller, more densely imbricated leaves and the shorter scape. That the very short scapes are not due to ecological factors was evident when the type of *sphaerula* was collected, for it grew among the tufts of *D. Nelsonii* in which the scapes were much elongated.

Collected on an alpine slope near Parker Mt., Custer Co., Idaho, July 17, 1916, *Macbride & Payson*, no. 3336 (type in Gray Herbarium, duplicate in Ry. Mt. Herbarium).

6. D. DOUGLASII Gray, Proc. Amer. Acad. **7**: 328. 1867.
Braya oregonensis Gray, Proc. Amer. Acad. **17**: 199. 1882.
Cusickia Gray, l. c.
D. Crockeri Lemmon, Bull. Torrey Club **16**: 221. 1889.

Specimens Examined.—CALIFORNIA: Sierras of California, *Lemmon.* OREGON: Dry, stony hills, eastern Oregon, May 24, 1898, *Cusick*, no. 1883. UTAH: 1858–59, *H. Engelmann.* This speciman is referred here very doubtfully. It is however too immature to make determination certain.

7. **Draba Nelsonii** Macbride & Payson, n. sp.

Cespitose alpine perennial, caudex-branches clothed with dead leaves below; leaves linear, 5–7 mm. long, 1 mm. or less wide, acute, midvein prominent, glabrous except for the strong marginal cilia: scapes slender, glabrous or sparingly pubescent, 1–4 cm. long: sepals greenish, usually glabrous; petals yellow, nearly twice as long as the sepals: fruiting inflorescence elongated: pods 6–15, broadly lanceolate. 3–6 mm. long, 2–3 mm. broad, simply pubescent, flattened: style 1 mm. more or less long: seeds 1–4 in each cell, wingless.

Of all the newly characterized species, *D. Nelsonii* seems to be the most distinct and most widely distributed. Its affinities are undoubtedly with the *oligosperma* group. In manner of growth, elongated raceme and rather small pods it is quite similar to *D. oligosperma* and might even be mistaken for that species except for the total absence of stellate pubescence in *D. Nelsonii.* It is a great pleasure for the authors to dedicate this plant to their friend and teacher, Dr. Aven Nelson, through whose efforts and assistance the expedition was made possible that led to the discovery of this fine species.

Specimens Examined.—CALIFORNIA: Castle Peak, Nevada Co., Aug. 3, 1903, *Heller;* Modoc Co., 1898, *Mrs. Bruce;* rocky, exposed ridges, Mt. Stanford, Nevada Co., July 17, 1892, *Sonne*, no. 14. IDAHO: exposed alpine summit, Antelope Mts., near Martin, Blaine Co., July 6, 1916, *Macbride & Payson*, no. 3077 (type in Gray Herbarium, duplicate in Ry. Mt. Herbarium); Soldier Mts., near Corral, Blaine Co., June 26, 1916, *Macbride & Payson*, no. 2894; exposed summit near Parker Mt., Custer Co., July 17, 1916, *Macbride & Payson*, no. 3253. OREGON: Blue Mts., July, 1886, *Cusick*, no. 1345. WASHINGTON: Yakima Region, 1882, *Brandegee*, no. 373 (in part).

8. D. OLIGOSPERMA Hook. Fl. Bor. Amer. **1**: 51. 1833.
D. andina (Nutt.) A. Nels. Bull. Torrey Club **26**: 352. 1899.

D. saximontana A. Nels. Bull. Torrey Club **27**: 264. 1900.

D. oligosperma was described as having white flowers and it is certain that in *D. andina* the flowers are yellow. Since there seems to be no other difference, however, the two species are merged.

Specimens Examined.—BRITISH COLUMBIA: Carbonate Draw, July 13, 1904, *J. Macmillan*, no. 297; Canmore, Ry. Mts., June 29, 1885, *Macoun;* Silver City, Ry. Mts., Aug. 3, 1885, *Macoun;* N. Fork of Old Man's River, Aug. 10, 1883, *Macoun*. IDAHO: Sawtooth National Forest, 1910, *C. N. Woods*, no. 80; Boise, *Wilcox*. MONTANA: Monida, Madison Co., June 16, 1899, *A. Nelson & E. Nelson*, no. 5423; Bridger Mts., June 15, 1897, *Rydberg & Bessey*, no. 4181; Bridger Mts., June 4, 1901, *W. W. Jones;* Bridger Canyon, May 15, 1901, *E. J. Moore;* Little Belt Mts., Aug. 10, 1896, *Flodman*, no. 498; Bridger Canyon, Bozeman, May 27, 1899, *Blankinship;* June, 1894, *Mrs. Moore;* Mt. Bridger, June 26, 1899, *Blankinship;* Bridger Mts., June 15, 1897, *Rydberg & Bessey*, no. 4180 (this seems to be nearly typical *oligosperma;* its flowers are white). NEVADA: Ruby Hill, July 7, 1891, *Jones;* Bunker Hill, Toiyabe Range, July 29, 1913, *Kennedy*, no. 4184. UTAH: Logan Peak, Cache Co., July 4, 1910, *Charles Piper Smith*, no. 2245. WYOMING: Bush Ranch, Sweetwater Co., June 10, 1900, *A. Nelson;* Golden Gate, Yellowstone Park, June 28, 1899, *A. Nelson & E. Nelson;* Laramie Hills, Albany Co., June 3, 1900, *A. Nelson*, no. 7019; Laramie Hills, Albany Co., May 30, 1898, *A. Nelson*, no. 4323; Laramie Hills, June 21, 1892, *B. C. Buffum*, no. 65; Kemmerer, June 1, 1907, *A. Nelson*, no. 9027; Laramie Hills, June, 1893, *A. Nelson*, no. 3237; T. B. Ranch, Carbon Co., June 20, 1901, *Goodding*, no. 58; Telephone Mines, Albany Co., Aug. 1, 1900, *A. Nelson*, no. 7873; Laramie Hills, May, 1895, *A. Nelson*, no. 1223; sandy hilltops, Laramie, May 25, 1910, *A. Nelson*, no. 9334; Freezeout Hills, July 10, 1898, *E. Nelson*, no. 4487; La Plata Mines, Aug. 29, 1898, *E. Nelson*, no. 5246; Gros Ventre Fork, June 8, 1860, *Hayden;* West Slope of Wind River Mts., June 6, 1860, *Hayden;* gravelly hills in Wind River Valley, May 15, 1860, *Hayden*; near Mammoth Hot Springs, Yellowstone Park, June, 1893, *Burglehaus;* Yellowstone Park, 1885, *Tweedy*, no. 567; near South Gap, June, 1873, *Parry*, no. 11.

D. pectinata (S. Wats.) Rydb. Bull. Torrey Club **39**: 327. 1912. *D. glacialis* var. *pectinata* S. Wats. Proc. Amer. Acad. **23**: 260. 1888. These seem according to specimens labeled by Rydberg in the Gray Herbarium to be referable to *D. oligosperma*.

9. **Draba incerta** Payson n. sp.

Somewhat cespitose perennial, caudex branching: leaves linear or linear-spatulate, 7–10 mm. long, about 2 mm. wide, not rigid, midvein obscure, greyish with long stellate pubescence and weak marginal cilia: sepals villous; petals yellow, twice as long as the sepals: fruiting inflorescence elongated: pods numerous (6–14), flattened, simply pubescent, broadly lanceolate, 4–6 mm. long: style evident, less than 1 mm. long: seeds neither winged nor margined.

Draba incerta ia a rather unsatisfactory species appearing almost as if it were produced by peculiar ecological conditions. It differs so strikingly in leaf characters from its nearest relative (*D. oligosperma*), however, that one could scarcely consider them identical. I find that Dr. Gilg has evidently considered this as a distinct species, although he has included more than one species under the manuscript name which he gave it. It may be distinguished from *D. oligosperma* by the thinner leaves which are not at all rigid and by the absence of the prominent midrib which characterizes that species. The pubescence too is longer and more diffuse.

Specimens Examined.—ALBERTA: Tunnel Mt., Banff, May 9, 1902, *N. B. Sanson;* Sulphur Mt., Banff, June 16, 1901, *L. R. Waldron.* WASHINGTON: Yakima Region, 1882, *Brandegee,* no. 371. WYOMING: among rocks on the summit, the Thunderer, Yellowstone Park, July 13, 1899, *A. Nelson & E. Nelson,* no. 5818 (type in Ry. Mt. Herbarium); Mt. Washburn, Yellowstone Park, Aug. 1885, *Tweedy,* no. 566.

10. D. BELLII Holm, Repert. Nov. Sp. Fedde **3**: 338. 1907.

I have seen one specimen of this species and that is from "crevices of rocks," Mansfield Island, Hudson Bay, Aug. 30, 1884, *Dr. R. Bell.*

11. **Draba vestita** Payson n. sp.

Very densely cespitose perennial; caudex much branched; leaves persistent and densely clothing the branches of the caudex; 5–7 mm. long, 1 mm. or more wide, broadly linear, thin and not at all rigid, midvein evident; pubescence rather long, involved, hairs in large part unbranched, none really stellate; sepals pubescent; petals apparently yellow, about twice as long as sepals: fruiting inflorescence corymbose; pods rather few (4–6), broadly lanceolate, flattened, densely pubescent with simple or branching hairs, 5–8 cm. long: style about 1 mm. long: seeds not winged.

The name *D. Gilbertiana* has been given to herbarium sheets of this species by Dr. Gilg. Unfortunately it has been impossible to discover his type and so, in conformity to the Vienna rules, a new name has been given to the species.

Specimens Examined.—ALBERTA: Sheep Mt., Waterton Lake, July 28–31, 1895, *Macoun*, no. 10278. BRITISH COLUMBIA: Heights above Carbonate Draw, Beaverfoot Mts., July 13, 1904, *R. T. Shaw*, no. 305. CALIFORNIA: Tiukuk Knob, Placer Co., Aug. 12, 1892, *C. F. Sonnee*, no. 15; summit of range between Devil's Cliff and Linker's Knob, Aug. 10, 1901, *Kennedy & Doten*. MONTANA: Bridger Mts., June 15, 1897, *Rydberg & Bessey*, no. 4173; Upper Marias Pass, Aug. 3, 1883, *Canby*, no. 28 (type in Ry. Mt. Herbarium); Mt. Bridger, June 26, 1899, *Blankinship*. OREGON: cliffs of the Wallowa Mts., July 31, 1899, *Cusick*, no. 2307. WASHINGTON: Cascade Mts., 1882, *Brandegee*, no. 373. WYOMING: Yellowstone Park, 1884, *Tweedy*, no. 204.

12. D. NIVALIS Lilj. Svensk. Vet. Akad. Handl. **1793**: 208. 1793.

Specimens Examined.—ALASKA: U. S. Coast Survey, 1871–72, *M. W. Harrington*. COLORADO: Elk Mts., 1881, *Brandegee*, no. 13268; Sawatch Range, *Brandegee*, no. 12714 (the Colorado specimens seen are not typical). GREENLAND: Distr. Holssenborg, Aug. 2, 1886, *L. Ko.derup Rosenvinge*. HUDSON STRAIT: Nottingham Island, Aug. 24, 1884, *R. Bell*. LABRADOR: Dead Islands, Aug. 17, 1882, *J. A. Allen;* Okkak, N. E. Labrador, *G. Auspach;* northern Labrador, 1873, *G. Auspach*, no. 404.

13. D. LONCHOCARPA Rydb. Mem. N. Y. Bot. Gard. **1**: 181. 1900.

D. nivalis elongata Wats. Proc. Amer. Acad. **23**: 258. 1886.

Specimens Examined.—CANADA: Kicking Horse River, Ry. Mts., Aug. 13, 1890, *Macoun;* Kicking Horse Lake, Ry. Mts., Aug. 12, 1890. *Macoun*. IDAHO: rock crevices, Parker Mt., Custer Co., July 17, 1916, *Macbride & Payson*, no. 3240. MONTANA: Boulder Creek, Aug. 1887, *Tweedy*, no. 36; Upper Marias Pass, Aug. 3, 1883, *Canby*, no. 26; McDonald's Peak, Mission Range, July 19, 1883, *Canby*, no. 27. WASHINGTON: Mt. Paddo, July 12, 1886, *Suksdorf*, no. 836.

14. **Draba laevicapsula** Payson n. sp.

Loosely cespitose perennial; caudex branching, leafy branches occasionally 1–2 cm. long: leaves linear, 7–10 mm. long, narrowed slightly at base, usually obtuse, not rigid, midvein evident; pubescence rather loosely stellate, marginal cilia evident, especially toward base of leaves: scapes slender, glabrous, about 5 cm. long, naked or with one or two small bracts: flowers unknown: fruiting inflorescence racemose, comparatively short (about 2 cm.): pods 4–7, narrowly lanceolate, flattened, 7–9 mm. long, 2–3 mm. wide: style scarcely 1 mm. long: seeds not winged.

Dr. Gilg apparently confused *D. laevicapsula* with *D. incerta* but it seems rather to be associated with *D. oligosperma.*

Specimens Examined.—CANADA: Rocky Mts., Aug. 1885, *Macoun;* IDAHO: summit of Steven's Peak, Coeur D'Alene Mts., Aug. 5, 1895, *Leiberg*, no. 1477 (type in Ry. Mt. Herbarium). MONTANA: Upper Marias Pass, Aug. 3, 1883, *Canby*, no. 29.

15. **Draba cyclomorpha** Payson n. sp.

Cespitose perennial: leaves clustered on the apices of the many branches of the caudex, rounded obovate, fleshy, midnerve indistinct, 5–6 mm. long, 3–4 mm. broad; pubescence simple, largely confined to the leaf margins: scapes leafless, sparingly pilose, 1–2 cm. long: flowers unknown: fruiting raceme short and corymbose: pods 3–10, glabrous, flattened, typically nearly circular but at times oblong, 4–5 mm. broad: style scarcely 1 mm. long: seeds not winged.

This species has been confused with *D. Lemmoni* to which it is in fact most nearly related. It differs from that species principally in the glabrous, broader pod.

Specimens Examined.—OREGON: Alpine Wallowa Mts., Aug. 29, 1900, *Cusick*, no. 2497 (type in Ry. Mt. Herbarium); alpine summits, Powder River Mts., Aug., 1886, *Cusick*, no. 1344.

16. D. LEMMONI Wats., Bot. Calif. II. 430. 1880.

Specimens Examined.—CALIFORNIA: summit of Mt. Lyell, Aug. 19, 1878, *Lemmon* (co-type); Mt. Dana, July, 1902, *Hall & Babcock*, no. 3606; Mt. Dana, June 28, 1863, *Brewer*, no. 1735; eastern base of Mt. Brewer, July 4, 1864, *Brewer*, no. 2811; Mt. Goddard, July, 1900, *Hall & Chandler*, no. 668; Little Kern Cr., 1897, *Purpus*, no. 5118; Mt. Dana, July, 1901, *H. M. Evans.*

17. **Draba asterophora** Payson n. sp.

Loosely cespitose perennial with rather long trailing caudex-branches: leaves about 1 cm. long, 4–5 mm. wide, obovate to oblanceolate, obtuse, thickish, midvein obscure; pubescence rather sparse, consisting mostly of long stalked, cruciform hairs, simple cilia almost entirely wanting; scapes slender, glabrous, 3–4 cm. long; fruiting inflorescence shortened with a tendency to become corymbose; pods 6–10, broadly lanceolate, 6–8 mm. long, 4 mm. broad, flattened, glabrous; style short (about .5 mm. long) but evident: seeds flattened, broadly winged.

D. asterophora is evidently allied to *D. Lemmoni* and *D. cyclomorpha* as shown by the similar leaves and fruiting racemes. The ranges of these three species also are rather close. The stellate hairs and winged seed make *D. asterophora* easily separable. But one specimen has been seen and that is from an altitude of 9,000 ft. on Mt. Rose, Washoe County, Nevada, Aug. 17, 1905, *P. B. Kennedy*, no. 1154 (type in Ry. Mt. Herbarium).

18. **Draba Mulfordae** Payson n. sp.

Cespitose perennial: leaves linear or slightly spatulate, obtuse, 7–10 mm. long, 1–2 mm. broad, not rigid, midvein obscure often rising above the ground on leafy shoots or sobols; pubescence of strong marginal cilia and long stalked stellate or branching hairs; scapes slender, pubescent, 3–4 cm. long; sepals pubescent, petals white (?), about three times as long as the sepals; fruiting inflorescence elongated; pods 8–12, lanceolate, 6–8 mm. long, flattened, pubescent; style slender, over 1 mm. long; seeds not winged.

This plant is rather intermediate between the *oligosperma* and the *ventosa* group. The linear leaves, strong cilia and elongated raceme ally it to the former and the tendency to produce leafy shoots to the latter. But one specimen has been seen; it is from Soda Springs, Idaho, June 21, 1892, and was collected by *A. Isabel Mulford* (type in Missouri Botanical Garden Herbarium).

19. D. VENTOSA Gray, Amer. Nat. **8**: 212. 1874.

D. Howellii Watson, Proc. Amer. Acad. **20**: 354. 1885.

D. sobolifera Rydb. Bull. Torrey Club, **30**: 251. 1903.

This seems to be the most variable species of the group. A number of varieties might be made separating plants of different localities but it seems to be impossible to draw specific lines within the group of specimens cited. It should be noted here that the style in *D. sobolifera* is .5 mm. long instead of 5 mm. as the description reads.

Specimens Examined.—CALIFORNIA: Siskiyou Mts., June 16, 1884, *Howell* (type no. of *D. Howellii*). NEVADA: Schellbourne, July 11, 1891, *Jones*. OREGON: head of Divine Creek, Steins Mts., June 14, 1901, *Cusick*, no. 2569; Steins Mts., June 2, 1885, *Howell*. UTAH:

Tate Mine, Marysvale, Aug. 28, 1894, *Jones*, no. 5936 (type no. of *D. sobolifera* Rydb.); Delano Peak, July 26, 1905, *Rydberg & Carlton*, no. 7231; near Beaver, June 7, 1913, *H. Redeker*, no. 50. WYOMING: High Peak between Snake River and Wind River Valleys, 1873, *Parry* (type no. of *D. ventosa*).

20. **Draba cruciata** Payson n. sp.

Cespitose perennial; caudex-branches slender; leaves oblanceolate, usually toothed, thickish, midnerve obscure, 7–10 mm. long, 2–3 mm. broad, acute or acutish; pubescence stellate, each hair usually bearing four arms, ciliae wanting or inconspicuous; scapes slender, 5–7 cm. long: sepals yellow, glabrous or pubescent; petals yellow, about three times as long as sepals: fruiting raceme elongated: pods narrowly lanceolate, 7–9 mm. long, 2 mm. broad, glabrous or simply pubescent, flattened: style slender, 1 mm. long; seeds not winged.

The relationship of this plant is not at all evident. Hall suggests that it is near *D. Lemmoni* and if it is, it should be placed with *D. asterophora* on account of the branched cruciform pubescence. The slightly toothed leaves are a most interesting development. CALIFORNIA: Vicinity of Mineral King, Tulare Co., July 10, 1904, *Hall & Babcock*, no. 5361 (type in Ry. Mt. Herbarium).

21. D. UNCINALIS Rydb. Bull. Torrey Club 30: 251. 1903.

I have seen no specimens of this species.

Type Locality.—Tate Mine, Marysvale, Utah.

22. **Draba sphaeroides** Payson n. sp.

Loosely cespitose perennial; caudex much branched: leaves clustered on the apices of the caudex-branches, narrowly spatulate, obtuse, green, 3–5 mm. long; pubescence rather long, ciliate and branching, but few truly stellate hairs present: scapes naked, slender, sparingly pubescent with branched or stellate hairs, 1–1.5 cm. long: sepals glabrous or sparingly pubescent; petals yellow, twice as long as the sepals: fruiting inflorescence racemose, 1.5–2 cm. long: pods 6–12, glabrous, ovoid, scarcely flattened, 3–4 mm. long; style slender, about 1 mm. long.

Plants with globose pods are more or less anomalous in this genus but in aspect and all other characters this plant is so obviously a *Draba* that no one would think of placing it elsewhere. Its affinities are doubtless with *D. oligosperma*. Collected above receding snow at an altitude of 10,800 ft. on Jarbidge Peak, Nevada, July 8, 1912, *Nelson & Macbride*, no. 1981 (type in Ry. Mt. Herbarium).

23. **Draba pterosperma** Payson n. sp.

Loosely cespitose perennial; caudex branched; leaves mostly in round tufts either on the apices of the caudex-branches or rising above the ground on sparingly leafy shoots or sobols, oblong, 3–5 mm. long, 1–2 mm. broad, rounded at the apex, midvein evident; pubescence silvery, loosely stellate, cilia present: scapes slender, pubescent, 2–6 cm. long: flowers showy; sepals pubescent; petals yellow, 7–8 mm. long, over twice as long as the sepals: fruiting inflorescence elongated: pods 6 or 8, broadly lanceolate, 8–9 mm. long, 4–6 mm. broad, flattened and often unsymmetrical, pubescent with stellate hairs: style slender, 2 mm. or more long: seeds about 4 in each cell, broadly winged.

Because of the winged seeds in this species and in *D. asterophora* one would be inclined to consider them closely related but such is probably not the case. This plant seems to be related to *ventosa* and so we must assume that the development of winged seeds has been accomplished independently by two different groups.

Specimens Examined.—CALIFORNIA: rock crevices, Marble Mt., Siskiyou Co., July 10, 1910, *Geo. D. Butler*, no. 1716 (type in Ry. Mt. Herbarium); Marble Mt., June, 1901, *H. P. Chandler*, no. 1654 (Mo. Bot. Gard. Herbarium and perfectly typical).

24. D. ARGYREA Rydb. Bull. Torrey Club **30**: 251. 1903.

Type Locality.—Sawtooth Mts., Idaho, head of Pettit Lake.

The specimens cited below are somewhat doubtfully referred here. Since, however, no authentic material of *D. argyrea* has been available, since our plants agree fairly well with the description and are from the same vicinity it has been thought best to leave the question undecided.

Specimens Examined.—IDAHO: rock crevices, alpine basin in Sawtooth Mts., above Redfish Lake, Blaine Co., Aug. 9, 1916, *Macbride & Payson*, no 3677; crevices in granitic rocks, Smoky Mts., Blaine Co., Aug. 13, 1916, *Macbride & Payson*, no. 3734.

25. **Draba sphaerocarpa** Macbride and Payson, n. sp.

Cespitose perennial; caudex much branched; leaves mostly borne in tufts on erect, nearly leafless shoots that rise above the caudex-branches, oblong or obovate, obtuse, 4–7 mm. long, thickish and midvein indistinct; pubescence finely and densely stellate; leaves silvery, cilia absent: scapes pubescent, rather stout: flowers unknown (probably yellow): fruiting raceme elongated, developing almost from very base of scape: pods many (8–12), scarcely compressed or flattened, ovate, stellately pubescent, 2–5 mm. long: style slender, 1 mm. or more long: seeds not winged.

This plant is most closely related to *D. argyrea* and in leaf characters it is practically identical. It is distinguished from that species by the small, subspherical pods and the peculiar inflorescence which develops from near the base of the scape. *D. sphaerocarpa* was collected at a much lower elevation than were the specimens referred to *D. argyrea.*

Type.—IDAHO: dry, granitic washes near the head of Redfish Lake, Blaine Co., Aug. 9, 1916, *Macbride & Payson*, no. 3677*a* (Gray Herbarium).

26. D. SUBSESSILIS Watson, Proc. Am. Acad. **23**: 255. 1888.

Type Locality.—"On the White Mts. of Mono Co., California, at 13,000 ft. altitude" (*W. H. Shockley*, July, 1886).

Specimens Examined.—CALIFORNIA: Mt. Dana, June 28, 1863, *Brewer*, no. 1735*a*; White Mts., Mono Co., Aug., 1885, *W. H. Shockley.*

UNIVERSITY OF WYOMING,
LARAMIE